

AMENDMENTS TO THE CLAIMS

Without prejudice, please cancel claims 21-33 and 41, and add new claims 43-57 so that the claims read as follows:

1– 33. (Cancelled).

34. (Withdrawn-Previously Presented) A method for producing vinyl-cis-polybutadiene rubber by a step of the cis-1,4 polymerization of 1,3-butadiene using a cis-1,4 polymerization catalyst in a hydrocarbon-series solvent, a step of the 1,2 polymerization of 1,3-butadiene in the concurrent presence of a 1,2 polymerization catalyst in the resulting polymerization mixture to generate 1,2-polybutadiene of a melting point of 170°C or more, and a step of the separation and recovery of vinyl-cis-polybutadiene rubber generated from the resulting polymerization mixture, the method including a step of adding a polymer substance with at least one unsaturated double bond per repeating unit to the production system of vinyl-cis-polybutadiene rubber.

35. (Withdrawn-Previously Presented) The method for producing vinyl-cis-polybutadiene rubber according to claim 34, where the polymer substance is at least one selected from polyisoprene, crystallizable polybutadiene of a melting point of 0°C to 150°C, liquid polybutadiene, and derivatives thereof.

36. (Withdrawn-Previously Presented) The method for producing vinyl-cis-polybutadiene rubber according to claim 34, where the amount of the polymer substance to be added to the production system is within a range of 0.01 to 50 % by mass to the vinyl-cis-polybutadiene rubber to be obtained.

37. (Withdrawn-Previously Presented) The method for producing vinyl-cis-polybutadiene rubber according to claim 34, where the step of adding the polymer substance to the production system is carried out in the polymerization mixture at an appropriate time point from the step of the cis-1,4 polymerization step to the step of the separation and recovery of the vinyl-cis-polybutadiene rubber generated from the polymerization mixture obtained after the completion of the 1,2 polymerization.

38. (Withdrawn-Previously Presented) The method for producing vinyl-cis-polybutadiene rubber according to claim 34, where the hydrocarbon-series solvent is a hydrocarbon-series solvent with a solubility parameter of 9.0 or less.

39. (Withdrawn-Previously Presented) A butadiene rubber composition prepared by compounding the vinyl-cis-polybutadiene rubber obtained by a production method according to claim 34 at 10 to 300 parts by mass per 100 parts by mass of a rubber selected from natural rubber, polyisoprene rubber, styrene-butadiene copolymer rubber or a blend rubber of at least two types thereof.

40. (Withdrawn-Previously Presented) A butadiene rubber composition for tire, where the vinyl-cis-polybutadiene rubber obtained by a production method according to claim 34 is used.

41. (Cancelled).

42. (Withdrawn-Previously Presented) A butadiene rubber composition for tire, where the vinyl-cis-polybutadiene rubber obtained by a production method according to claim 34 is used at 10 to 300 parts by weight per 100 parts by weight of a rubber selected from natural rubber, polyisoprene rubber, styrene-butadiene copolymer, rubber, or a blend rubber of at least two types thereof.

43. (New) A vinyl-cis-polybutadiene rubber, comprising cis-polybutadiene rubber, 1,2-polybutadiene, and a polymer substance having a melting point lower than that of the 1,2-polybutadiene and having at least one unsaturated double bond per repeating unit,

wherein the polymer substance comprises at least one selected from the group consisting of polyisoprene, crystallizable polybutadiene having a melting point less than 170°C, liquid polybutadiene, a polymeric compound containing an oxygen bond, and derivatives thereof, wherein the polymeric compound containing an oxygen bond comprises an ether group, epoxy group, carboxyl group, ester group, hydroxyl group or carbonyl group, and

wherein the 1,2-polybutadiene and the polymer substance are dispersed in the cis-polybutadiene rubber as a matrix component of the vinyl-cis-polybutadiene rubber in an adsorbed state, so as to be insoluble in boiling n-hexane.

44. (New) The vinyl-cis-polybutadiene rubber according to claim 43, wherein the 1,2-polybutadiene and the polymer substance are dispersed as short crystal fibers, particles, or both, in the cis-polybutadiene rubber as the matrix component of the vinyl-cis-polybutadiene rubber.

45. (New) The vinyl-cis-polybutadiene rubber according to claim 43, wherein the 1,2-polybutadiene is 1,2-polybutadiene having a melting point of 170°C or more, and wherein the polymer substance comprises at least one selected from the group consisting of crystallizable polybutadiene having a melting point of 150°C or less and derivatives thereof.

46. (New) The vinyl-cis-polybutadiene rubber according to claim 43, wherein the polymer substance is present in a range of 0.01 to 50 % by mass relative to a total of crystal fibers of the 1,2-polybutadiene and the cis-polybutadiene rubber.

47. (New) The vinyl-cis-polybutadiene rubber according to claim 43, wherein the viscosity of the cis-polybutadiene rubber as the matrix component in toluene solution at 25°C is in a range of 10 to 150 centipoise.

48. (New) The vinyl-cis-polybutadiene rubber according to claim 43, wherein $[\eta]$ of the cis-polybutadiene rubber as the matrix component is in a range of 1.0 to 5.0.

49. (New) The vinyl-cis-polybutadiene rubber according to claim 43, wherein the cis-polybutadiene rubber comprises 80% by mass or more of a 1,4-cis structure.

50. (New) The vinyl-cis-polybutadiene rubber according to claim 43, wherein the mooney viscosity of the cis-polybutadiene rubber as the matrix component of the vinyl-cis-polybutadiene rubber is in a range of 10 to 50 (ML₁₊₄) as measured according to JIS K6300.

51. (New) The vinyl-cis-polybutadiene rubber according to claim 43, wherein the 1,2-polybutadiene is dispersed as short crystal fibers in the cis-polybutadiene rubber as the matrix component of the vinyl-cis-polybutadiene rubber, wherein the polymer substance is dispersed as

particles in the cis-polybutadiene rubber, and wherein short crystal fibers of the 1,2-polybutadiene are also dispersed in the polymer substance particles.

52. (New) The vinyl-cis-polybutadiene rubber according to claim 51, wherein the short crystal fibers of the 1,2-polybutadiene comprise first fibers and second fibers, wherein the first fibers have a length along a major axis in a range of 0.2 to 1,000 μm and are dispersed in the cis-polybutadiene rubber as the matrix component, and wherein the second fibers have a length along a major axis within a range of 0.01 to 0.5 μm and are dispersed in the polymer substance particles.

53. (Withdrawn-New) A butadiene rubber composition prepared by compounding the vinyl-cis-polybutadiene rubber according to claim 43 at 10 to 300 parts by weight per 100 parts by weight of another rubber comprising at least one selected from the group consisting of natural rubber, polyisoprene rubber, and styrene-butadiene copolymer rubber.

54. (Withdrawn-New) A tire comprising the butadiene rubber composition according to claim 53.

55. (New) The vinyl-cis-polybutadiene rubber according to claim 43, wherein the polymeric compound containing an oxygen bond is selected from phenol resin, nylon resin, polyurethane, polyethylene glycol, epoxylated polybutadiene, polyester, epoxylated styrene/butadiene copolymer, polyaryl ether, and allyl ether copolymer.

56. (New) The vinyl-cis-polybutadiene rubber according to claim 43, wherein the polymer substance comprises at least one selected from the group consisting of polyisoprene, 1,2-polybutadiene having a melting point of 90°C, liquid polybutadiene, epoxylated polybutadiene, and an allyl ether copolymer.

57. (New) The vinyl-cis-polybutadiene rubber according to claim 43, wherein short crystal fibers of the 1,2-polybutadiene are not contained in particles of the polymer substance.